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Digital Community Best Practices

This paper provides local government stakeholders with a process overview of the implementation stages for a Digital Community metro-area broadband solution, including core-group needs analysis, building a business case and community consensus, funding scenarios, private-sector partnering, and network management.

Abstract

Broadband communications infrastructure is creating new cost-saving and quality-of-life capacities in cities, communities and regions. Once in place, a Digital Community infrastructure with both wired and wireline elements supports a wide range of applications and eServices for government and its employees, businesses and citizens. Creating a Digital Community can empower local authorities to accomplish more with scarce resources, enhance security, encourage business growth, and bridge the digital divide. But the technology build-out is just one part of a Digital Community plan. Ensuring a broad return on investment requires a core-group needs analysis, key political buy-in, and measurable value at each step of the way.

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Executive Summary

In the early 21st century, local governments everywhere are pressed with the need to:

• make high-speed Internet access available and affordable,

• lower the cost of government operations,

• enhance security and safety,

• promote local economic competitiveness,

• improve quality of life and citizen satisfaction.

Consequently, local authorities and government IT professionals are playing a greater role in developing, promoting, and managing broadband communications networks to meet these needs[1]. In the process, they are exploring how a scalable, cost-effective broadband-wireless infrastructure can be integrated into existing broadband, fiber optic, and IP networks to achieve a compelling return on investment for government, businesses and the community. By deploying ubiquitous, wireless-cloud communications capacities, local governments are changing the way they treat their employees and serve their constituents, deliver cost-saving applications to increase worker efficiency and citizen satisfaction, and make available a platform to enable multiple service providers to compete on an equal footing.

The technology build-out is just one part of a Digital Community plan. Fundamental to providing and sustaining a broad range of applications and services is a thorough needs analysis, business case and versatile management model to guide the community toward a maximum benefit from the network producing real positive change in people's lives. A series of overlapping stages addresses the brainstorming, technological and financial hurdles and enables all local stakeholders to accomplish a major portion of a desired outcome.

The stages include:

• identifying a core action group,

• reaching out to technology providers,

• devising a business case,

• building community consensus,

• locating funding sources,

• exploring partnership opportunities,

• establishing a management model.

As catalysts for building consensus, marshaling resources, and passing enabling legislation, local governments bring to bear considerable strengths in the creation of a Digital Community, most importantly the leadership to ensure that the applications and services mirror local priorities, achieve efficiencies and increase satisfaction, and deliver a broad return on investment to the community.

Figure 1. In planning a Digital Community, a series of overlapping stages can repeat as more resources become available and new priorities emerge.
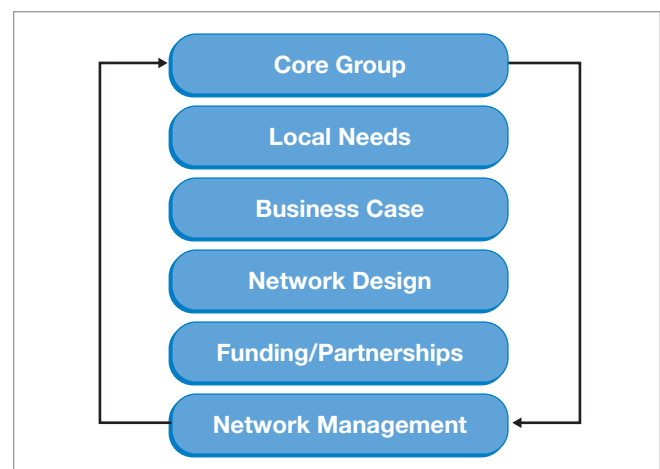
What Is a Digital Community?

A Digital Community is a connected community that combines broadband communications infrastructure; flexible, service-oriented computing infrastructure based on open industry standards; and innovative services to meet the needs of governments and their employees, citizens and businesses.

In a Digital Community, broadband technologies enable high-speed communication from virtually every corner of the community, and wireless, Internet-enabled tablet PCs and handheld devices enable field staff on the move—from meter readers to home health nurses to emergency response teams—to communicate with the office and access mission-critical information. Citizens can access government services from civic kiosks or from the comfort of home via their Internet-connected PCs.

While wireless infrastructure is a key element of Digital Community infrastructure, it is only a first step. The Digital Community may require hard-wired broadband infrastructure, and it is much more than just the network. A Digital Community provides interoperable, Internet-based government services that enable ubiquitous connectivity to transform key government processes, both internally across departments and employees and externally to citizens and businesses. Digital Community services are accessible through wireless mobile devices and are enabled by services-oriented enterprise architecture including Web services, the Extensible Markup Language (XML), and mobilized software applications.

Primary Drivers, Multiple Phases

While a Digital Community supports a rich palette of applications and services, it often begins with a first-stage infrastructure deployment for a single application or mobile communication need, such as the cost-saving automated meter reading now deployed in Corpus Christi, TX, or the field-force productivity improvements made by the San Mateo, CA, Police

Department. This initial need, which delivers a positive return on investment, is typically called a primary driver and can include:

- delivery of a **cost-saving municipal application** to increase government efficiency and productivity;

- replacement or enhancement of **legacy communications infrastructure** because of bandwidth undercapacity, expensive recurring costs, and insufficient upgrades;

- **economic development,** job retention, new-business attraction, and tourism;

- improved **citizen satisfaction** with high-speed data/voice/video services to remote communities and low-income areas ignored by large DSL or cable providers.

The primary driver is used to secure key political buy-in and justify an initial technology investment in the hundreds of thousands to the millions of dollars (see Table 1).

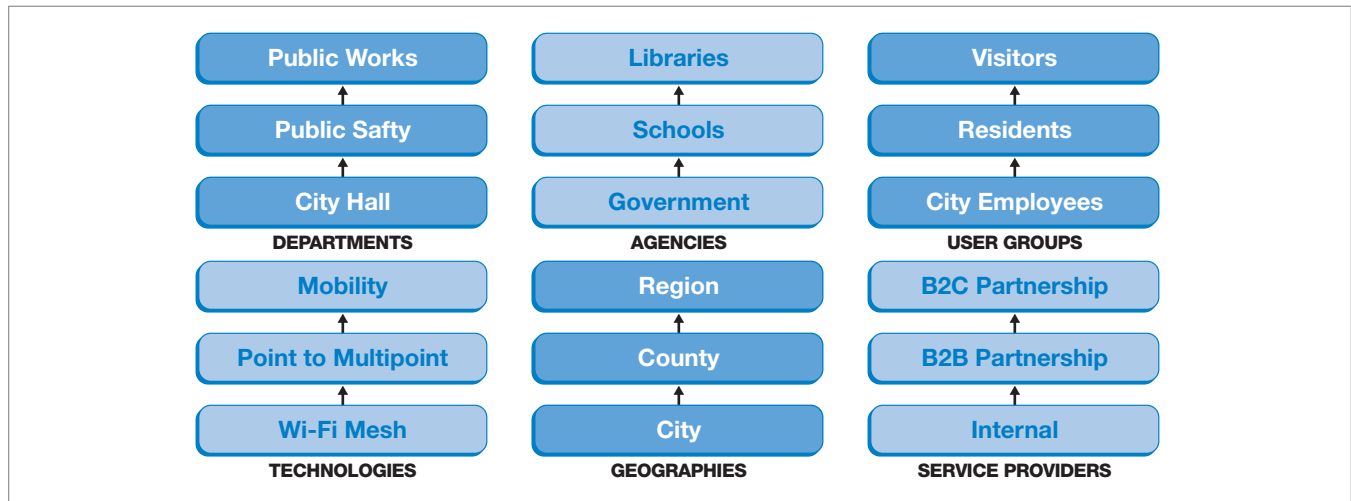**Table 1.** Some Digital Communities and their primary drivers.

MUNICIPALITY	PRIMARY DRIVER
Chaska, MN	Digital divide for schools, businesses and residents
Cheyenne, WY	Traffic-signal management
Corpus Christi, TX	Automated meter reading for city-owned utilities
Lewis and Clark County, MT	T1 replacement; access to remote county buildings
Medford, OR	CDPD replacement public safety
Ocean City, MD	Integrated digital, voice and video for city buildings
Piraí, Brazil	Municipal field-force productivity; promotion
Portsmouth, UK	Bus passenger information dissemination
San Mateo, CA	Police field-force productivity improvement
Shanghai, China	Police field-force productivity improvement
Spokane, WA	Municipal applications and e-Government initiatives
Westminster, UK	Video surveillance and enhanced security

The City of San Mateo, California, Police Department installed a Wi-Fi mesh network that allows 72 officers in 40 patrol cars to take their desks on the road, helping to make the public safer and officers more effective in their jobs. "We have an intranet in San Mateo County connected to all the law-enforcement agencies, and we use it to share data, photographs, and large files," says Lt. Wayne Hoss, project leader. "In the past, officers would return to the station and use this intranet to get a DMV photograph, a report from another city, or a six-pack of mug shots to show victims, but now they can do this in their patrol cars."

Officers have secure access to the Department of Justice, Amber Alerts, Megan's Law, and the Cal Photo Database. When an officer moves to Wi-Fi coverage, he not only has access through CAD but through RMF, video server, the Internet and the intranet.

"We've just begun to play with video surveillance to see exactly what that application is for us," Hoss says. "We can monitor back to the police station and control the camera from the patrol car. Wireless surveillance gives you the extra boost that you need." Foreseeable applications include traffic monitoring, connectivity to city hall and the sewage treatment plant, and 24-hour remote monitoring of city buildings.

DEPARTMENTS	AGENCIES	USER GROUPS
Public Works	Libraries	Visitors
Public Safty	Schools	Residents
City Hall	Government	City Employees

TECHNOLOGIES	GEOGRAPHIES	SERVICE PROVIDERS
Mobility	Region	B2C Partnership
Point to Multipoint	County	B2B Partnership
Wi-Fi Mesh	City	Internal

But the primary driver and first-stage infrastructure deployment are just the beginning of the Digital Community. Gradually, the network is extended and services are deployed to one or more departments as individual applications. As departments and agencies begin to interoperate more efficiently, and citizens gain convenient access to new or streamlined government services, the Digital Community expands across multiple phases and directions (see Figure 2, above).

Digital Community Best Practices

At the heart of Digital Community planning is both a careful assessment of the technological and financial challenges of deployment as well as a thorough evaluation of local community needs to ensure a broad-based return on investment. Well coordinated planning ensures that point solutions complement and reinforce one another while:

• Curtailing competing objectives or business plans among different city agencies or within the community.

• Uncovering additional returns through efficiency and productivity gains in local-government operations.

• Ensuring that technical feasibility, market studies for new services, replacement strategies for sunk investments, and financing strategies are in the same plan.

Core-Group Discovery

Begin by organizing the energies of diverse players through an informal brainstorming process. Invite town officials, administrators, public-safety and public-works heads, economic-development-board and Chamber of Commerce leaders to a review of the community's IT plan. Ask a few broad questions to start the discussion:

• What do you want to accomplish?

• What user groups need support?
  • Is it city operations?
  • Is it public safety?
  • Is it quality of life?
  • Is it economic development?
  • Is it education?

• What issues and opportunities do you want to address?

• What are the measurements of success?

Gather information about local demographics and population densities, broadband penetration and cost, and the hot spots for bandwidth consumption[2]. Conduct focus groups with local business partners, survey city residents and e-mail blast on local listservs.com for feedback to enrich the self-discovery phase. The more you know about government needs, business requirements and community desires, the better positioned you'll be when building a business case and pitching the network to decision makers. Which needs match which services (see Table 2)?

Table 2. Match needs and desires with potential Digital Community service outcomes.

SERVICES FOR CITIZENS AND BUSINESSES	SERVICES FOR GOVERNMENT EMPLOYEES
• Police accident reports	• Site locates/GIS maps
• Parking-ticket payment	• Maintenance orders
• Tax payments, ID Numbers	• Record management
• Licensing and permits	• Firefighter locator chips
• Utility payments	• Security cameras
• Emergency response	• Public-works work orders
• Tourism and recreation services	• Remote video surveillance

The City of Corpus Christi, Texas (population 300,000) has begun installing a $7-million, 2,000-cell Tropos Wi-Fi mesh network to do automated reading of city-owned gas and water utility meters. The meters will transmit data to a central server, allowing customers to keep tabs online daily. The system cuts downs on misreadings as well as mishaps to meter readers accessing difficult properties. Close monitoring helps utility managers match gas usage with gas price fluctuations and control water flow to reduce system breaks.

But AMR is just the beginning for Corpus Christi. Pronto Networks'* software-management platform provides IP-based security, the ability to manage multiple subscription services, and a "walled garden" to the public so the city can provide access to government sites and schools. Some students in Corpus Christi are beginning to receive Wi-Fi enabled laptops, and they'll go past the walled garden to check homework on the school's site.

"When we started looking at the bandwidth, there was an awful lot left over to do some things for folks who would want to be roaming about wirelessly in the city," says Leonard Scott, MIS unit manager and project leader. Of the city's 3,000 employees, the 70 percent who work in the field will benefit from dozens of planned mobile solutions. In the event of a bank robbery or remote tactical situation, public-safety responders will click on links that take them instantly to security cameras. The technology can be expanded to container operations at the city's large port and will accommodate smart-chip technology for monitoring firefighters entering burning structures.

To advise you, reach out to Internet service providers, wireless Internet equipment manufacturers, systems integrators and others with a list of requirements for throughput and geographical area. These experts can:

- do an initial site survey,
- explain technologies and frequencies,
- produce a scope-of-work statement,
- make a presentation to the community.

Needs Drive the Business Case

Local government can expect a benefit from a deployment almost from day one, with return on investment (ROI) measured in weeks, months or a small number of years rather than in decades, as it might be for a major infrastructure provider. At the same time, it runs the risk of buying into a technology that might not bring the benefits it had hoped for. To galvanize the business case and speed cost recovery, factor in savings and quality-of-life improvements from Digital Community applications and services that meet local needs and desires (see Figure 3).

Business Case 1: City operations efficiencies—In a Digital Community, city workers can produce more because they have high-speed access to information and databases, use tablet-size PC devices for field operations, and send fresh, detailed reports back to base immediately after each call, which means

Figure 3. Building the business case. Use a primary driver (grey) to justify a first-phase deployment, but factor in the broad range of applications and services that can make city operations more efficient, improve citizen satisfaction, enhance economic development, and bridge the digital divide.
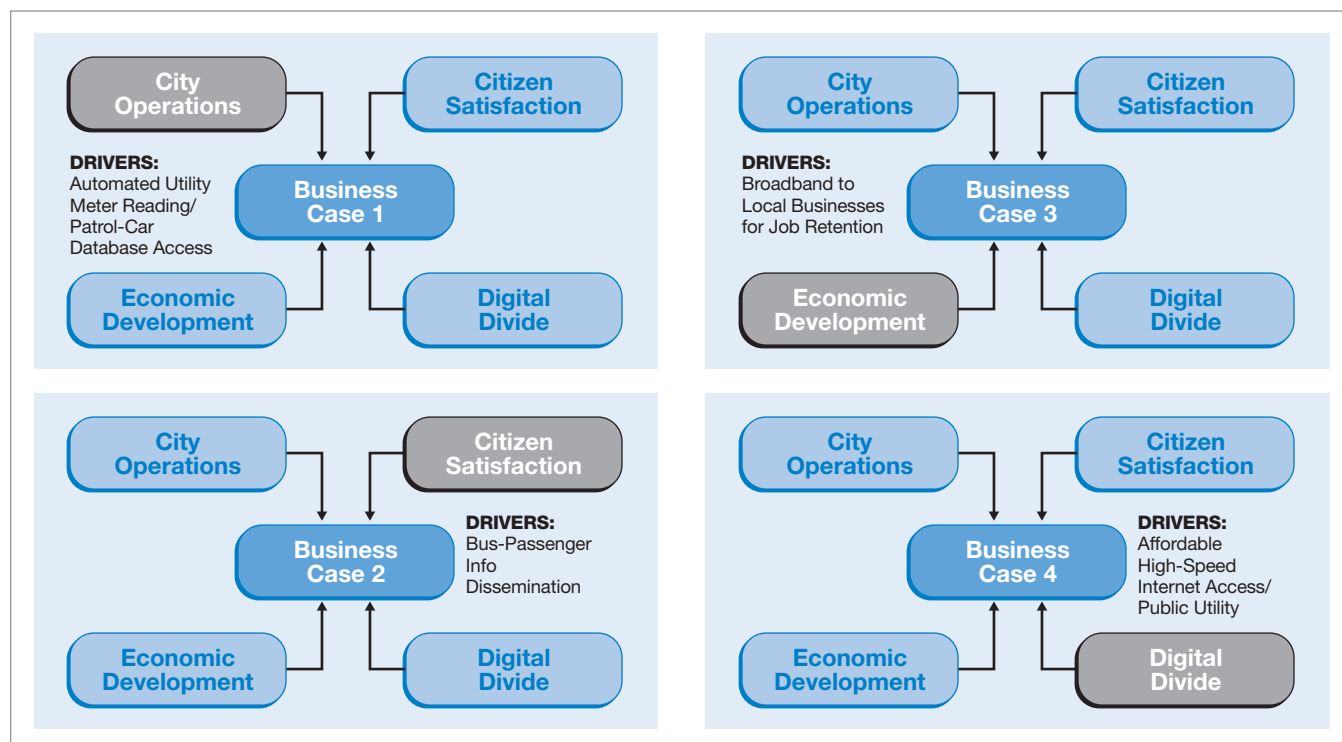
they can carry out more inspections, repairs and visits per day while providing their colleagues with up-to-date information. Staff and officials can be more effective, and their services provide better value to the citizens who pay for them.

- Estimate the efficiency gains and increased productivity in field-based operations for public safety and public works, including the addition of portability and mobility components. Ask police officers, inspectors, engineers, and field crews about the amount of time they could save by accessing work orders, filing reports, and doing locates on site—on the whole, reporting less often to headquarters. Get the numbers on paper, and you'll be surprised how much is being spent, and how much can be saved. If video security is a foresee-able driver, factor in that broadband wireless is really the only way to enable this affordably.

Business Case 2: Citizen satisfaction—Whether interacting with emergency first responders, obtaining a business license, or helping their children with homework assignments, citizens of the Digital Community will perceive that government is operating efficiently and effectively, and is creatively addressing the challenges of 21st century life. Citizens can pay bills, obtain government licenses and access information about local traffic problems, events and leisure activities. Schools, hospitals, city offices, libraries and community centers leverage one another's resources and infrastructure, enabling citizens to contribute to their communities and communicate with their local governments.

- Citizens will be able to share the network, bringing themselves for the first time to the doorstep of e-Government, a bonus that may strengthen the business case through further cost savings in city operations.

Business Case 3: Economic development—Cities can make themselves more attractive to businesses and potential citizens through advanced communications networks and services. With a more computer-savvy populace, Digital Communities can attract more of the burgeoning services sector, replacing lost manufacturing jobs and raising the standard of living. Tourism is enhanced as well, because visitors can get online more easily.

- While the impact of broadband networks on economic development can require a long term measurement over years, the need for high-speed Internet connectivity can present itself overnight. The business case will include a range of projections for job retention, job creation, new-business attraction and increasing the tax base. Survey local businesses for their broadband infrastructure needs and promote the network to attract IT and service-sector employers.

Business Case 4: Digital divide—Digital Communities bring the worldwide community to its citizens through Internet-based communication and education. The increased availability of information and services online drives demand for PCs and mobile computers. The local economy benefits as more households invest in a PC and Internet access. This not only increases citizen satisfaction but creates new job opportunities by raising workforce skills and equipping workers for success in the global knowledge economy.

- What are your community's needs? Conduct a market assessment and outline availability and affordability gaps. Local governments and stakeholders are poised to develop new models that could also guarantee high-speed connectivity as a new essential good of the 21st century.

The business case will include the selection of appropriate technologies and a thorough examination of deployment and maintenance costs. Prepare a cost-benefit analysis, examine cash flows, funding, financing requirements, and external sources of revenue, including leasing bandwidth across the city-owned architecture to local service providers (see Table 3).

Table 3. High-speed Internet service to the general public can roll out through a variety of models.

City-owned public utility	A municipality may compete on the market like a true public utility, providing affordable broadband service to businesses and residents, managing subscriptions and billing as it would for water, gas and electricity. This model can simultaneously raise protests about unfair competition on the part of local government and accolades for affordable Internet access in the long tradition of municipal utility service provision.
City-owned "walled garden"	A "walled garden" delimits public access to the city-owned infrastructure so that excess bandwidth may be leased to wireless ISPs who manage subscriptions and billing, generating revenues to pay for the city-owned infrastructure.
City-owned free access	Local governments seeking to provide free community access to the Internet may publicly differentiate between the city network, which serves the public space, and local ISPs, which can penetrate interiors of businesses and residences and normally provides quality of service (QoS) guarantees.
Private-sector partnership	In a private-sector partnership, a broadband entrepreneur deploys the infrastructure and manages revenue flows and much of the network's destiny. The city may take a share of revenues while easing implementation and expansion for the entrepreneur.

Building Community Consensus

Ultimately, it's the collaborative spirit in which government departments, agencies, businesses and the broader community work together that can make a broadband communications infrastructure flourish over the long term. Approach city councilors and county commissioners and begin to explain primary drivers, scalable infrastructure, multiple-phased rollout, ubiquitous connectivity and mobility components. A Digital Community transforms key government processes, both internally across departments and employees, and externally to citizens and businesses. Show how the business case uplifts the entire community, and that when everyone plays together it gets more cost effective. The focus should be on bringing a measurable benefit to the city and community as much as on new wireless infrastructure.

As questions arise, arrange teleconferences between city administrators and solutions providers. Citizens will invariably be curious, officials will want to polish the local image, and the media will report on the meaning of a ubiquitous high-speed Internet access. For public-safety-specific deployments, expect special attention from the press.

Funding for Deployments

Local government may seek a variety funding solutions both within local coffers and through external sources to get a first-phase deployment off the ground. Wealthier communities may make the lion's share of the investment up front, while resource-poorer communities will need to get creative. Try searching for redevelopment funds within city budgets. How does the broadband budget fit into the municipal budget?

How does it compare with the roadwork budget? Which one gets priority? Consider promoting a set-aside fund for Digital Community initiatives.

With a convincing business case and community consensus, the core group can make the case for funding to a range of government-operations and technology agencies supporting homeland security and intelligent transportation systems, port security and firefighting. Look into the Department of Commerce's Technology Opportunities Program and the Department of Agriculture's Rural Broadband Access Loan Guarantee Program. The more people with a stake in the project, the better: Partnerships among diverse governmental agencies at the local, state, and federal levels can mean a sharing of the financial burden and speed the magic point of cost recovery.

Try hiring a consultant to identify grants that best fit your situation. When applying, remember the phased aspects of deployment and moderate your initial expectations. A first phase showing an immediate benefit can build momentum for future funding. (Because Ocean City, Maryland, paid entirely for phase one, later grants for adding mobile data and Wi-Fi access were easier to obtain.) Look at grants that connect Parks & Recreation, libraries, schools, and transportation. Here, again, sharing the network among different community agencies can make monies go farther. Additional sources may include venture-capital firms, equipment bonds, interagency loans, and private-sector partnerships. Consider a wholesale leaseback model or private financing. And be creative with capital and operational expenditures. With a broadband-wireless solution, you can make the case for a one-time capital expenditure versus the recurring costs of telecom leased lines.

Ocean City, MD, (population 8,000) chose an Alvarion point-to-multipoint WiMAX-like solution with a five- to six-year payback to replace expensive switching equipment and integrate a hodge-podge of telephone networks in government buildings. The city council approved $1.2 million to bring data, voice and video (DV2) to 19 city buildings, allowing all staff to connect over the same phone system, and workers to ship large GIS maps around the community.

In a second phase, the installation of 900-MHz base stations on five tower locations in the town will allow remote dissemination of maps to public-works and public-safety in case of emergency, as well as Automatic Vehichle Location (AVL) and security cameras on buses, reducing public-safety overtime hours during the tourist-heavy summer months. In a third phase set for 2006, Wi-Fi access points in vehicles and a mobile command center will enable connectivity to PDAs and laptops in the neighborhood of field-force vehicles, giving the look and feel of countywide Wi-Fi.

The City of Medford, OR, (population 65,000) deployed a MeshNetworks* (Motorola) Wi-Fi network primarily to replace public-safety's CDPD network. At the same time, project leaders evaluated the potential benefit to all city departments to galvanize their business case. Doug Townsend, Director of Technology Services for Medford, says: "When we first began to build our business case, public works came back with initial numbers that made them the largest beneficiary from being mobile—the work that they could perform in the field without having to return to headquarters. They calculated it would save them about an hour a day per crew. Inspections are part of it, repair, traffic, different crews dispatched for different reasons, and all of them needing to do locates and access work orders in the field. After we deployed, the second in command in the Building Department came up with a list with about 20 other benefits that we did not anticipate. Initially, they were one of the lower in terms of an ROI anticipated, and now they are realizing significant advantages."

Finally, look for unique organizations that leverage local exper-imentation and innovation for economic development. Entities like the Georgia Research Alliance provide technology funding in exchange for research projects that can bring jobs to Georgia.

Private-Sector Partnerships

Local governments who have tight purse strings, are risk averse or don't want the responsibility of owning and maintaining their own broadband deployment should be willing to consider entering into infrastructure, revenue- and risk-sharing models with private industry.

The public and private sectors bring complementary assets to the table. Local government can create enabling environ-ments, maintain continuity of vision, leverage a variety of funding mechanisms, and promote the infrastructure to the community. The private sector can provide innovative solutions, entrepreneurial drive, service-level agreements, and private capital.

At the same time, local government and the private sector work on different time lines, and a partnership should examine how to accommodate the pace and style of both. Any negoti-ation will carefully consider who controls the network, which can affect the flow of investment dollars and revenues. Private-sector service providers simply seeking a service-provision agreement with local government will need to listen carefully to the latter's expectations. For local governments not intending to spend a dollar, the destiny of the network will be left to the entrepreneurial entity and its financial and technical wherewithal.

In the event that multiple partners are corralled together, who gets the revenues? If the service runs short and must be subsidized, who pays? Who tells Partner A that it's being inefficient because it's spending its money unwisely, when Partner B is pulling its own weight? Which neighborhoods come first, and who gets the next-highest improvements?

Among the range of public-sector/private-sector partnership models, local governments may:

- license out operations to a solutions provider, which then sets the benchmarks to meet the basic requirements of the license agreement;

- lease out capacity on existing wireline infrastructure (fiber) to local ISPs;

- partner with service providers who have already laid fiber;

- deploy across city utilities with existing wireline and wireless infrastructure.

The City of Spokane, WA, (population 200,000) has deployed 5 Vivato* Wi-Fi base stations and 12 outdoor bridge/routers throughout the downtown area to provide wireless connectivity to a 100-block core, with additional deployment phases planned. The wireless network includes two domains serving private and public user groups. The private domain is for exclusive use of the city to facilitate operational and municipal communication applications to improve city services, allowing workers wireless access to the city's computing resources and database information, including building floor plans, fire inspection reports, mug shots and equipment repair manuals. This domain serves the police department, fire department, computer-aided dispatch services, downtown parking violations department, sewer treatment plant, etc.

The second domain is public access within the wireless coverage area, primarily providing Internet surfing and, gradually, access to e-Government services. From a commercial perspective, the city is gathering data to determine site traffic and is designing an advertising campaign to drive retail traffic into the city's core.

Managing the Network Infrastructure

The network makes available infrastructure to enable multiple service providers to compete on an equal footing, which:

- lowers costs,

- ensures diversity and breadth of services,

- addresses a broad range of constituencies' needs.

Moreover, how the network is managed links directly to how it has been planned. A basic operations support system will allow Internet access with very simple authentication procedures. But a more sophisticated platform enables greater control and the layering of services like voice-over IP, video down-loads, gaming, and the Internet.

A sophisticated software-support solution is where Digital Community planning comes full circle as applications and services are integrated and rolled out across a single software platform to support:

- mixed use for public and private users, where public-safety personnel access their own separate network requiring only a MAC laptop address or USB authentication key while residents and visitors share the same infrastructure through a login page;

- bandwidth monitoring, allocation and prioritization, which is especially important during emergency first response, and for providing the best bandwidth service to the most preferred customers;

- back-office billing to monthly subscribers and 24-hour visitors or, in a public-utility model, for bandwidth delivery;

- city-government, local-business and community splash pages tailored for different user groups and city functions (utilities, zoning, public safety, etc.);

- SSL-encrypted registration and authentication for secure, encrypted access to one's local-government LAN[3].

The software should enable smooth communication across the network, including auto-provisioning capabilities and remote upgrades when new features are added. These can be sent remotely to upgrade any of the gateways or controllers in the field, which reduces operating expenses and the amount of staff needed to maintain the system. While most of the cost analysis is in bringing wireless hardware into the city, don't forget to drill down into operations and maintenance to find more cost savings.

State Regulatory Hurdles

Typically, states make their own laws concerning the provision of telecommunications services. In recent years, phone companies and cable providers have actively lobbied local and state governments to stop public agencies and municipalities from building their own communications networks, arguing that city-managed networks operate under different rules than those for private providers, offering the city regulatory and economic advantages over industry.

Today, some 15 U.S. states prohibit municipalities from rolling out broadband infrastructure, and in nearly a dozen legislatures bills are pending that may seriously slow deployment plans, if not prohibit them outright. Many of these bills make requirements on the municipality to undertake feasibility studies, long-term cost-benefit analyses, public hearings, and referendums, all of which may slow local implementation while, ironically, providing useful market data to private industry.

While some of these bills have grandfather clauses for existing municipal deployments, and allow exemptions for under-served areas, on the whole, incumbent service operators want to retain the option to expand to underserved areas if and when it can become profitable no matter current local needs. Several years into the broadband revolution, this state of affairs has begun driving a serious search at the local level for low-cost alternatives.

Is there a middle ground? Municipalities have long played a valuable role in providing necessary services for citizens and in stimulating local economies. Could incumbent service operators begin sharing in the responsibilities of broadband

The City of Portsmouth, UK, (population 200,000) has installed a combination Wi-Fi mesh and GPRS system to track and provide passenger information for more than 300 buses on 47 routes across the city and up to 40 miles outside. Information about bus arrival and departure times is broadcast on LCD displays in stainless steel and glass bus shelters. Ultimately, the system encourages more use of public-transport infrastructure and reduces reliance on the car. The network also tracks driver identification, journey number and attack-alarm status back to the central Automatic Vehicle Location, or AVL, server. Each of the 36 bus stops and 9 freestanding information points has Internet and e-mail facilities that feature services to citizens such as local job listings. With the citywide mobile broadband network in place, Portsmouth is well prepared to continue deploying a raft of applications to support government operations and increase citizen satisfaction.

For the City of Scottsburg, IN, (population 6,000) economic development emerged overnight as an urgent primary driver of a broadband-wireless solution. Fiber runs through this small town outside Louisville, and town fathers had been requesting service for four years, but the incumbent service operator could not economically justify rolling out last-mile connectivity to the community. As a result, businesses in Scottsburg were contemplating leaving or expanding elsewhere.

An owner of a local car dealership approached the mayor detailing the bad news: Because his franchise was now required to have two T1 lines to download manufacturer repair manuals, his business and the 72 jobs it supports were on the verge of relocating.

So the city made a $385,000 investment in a broadband-wireless solution to be managed by the town's electric utility. The result? Scottsburg provides broadband service to local businesses at half the cost of nearby Louisville. It sets its own rate structure, and two employees do the billing in a local office while utility workers maintain the network. Backhaul is derived from three different T1 providers, including one from the original incumbent. Thanks to the new infrastructure, employees have held onto their jobs, at least one business is expanding into e-commerce, the town has maintained its tax base, and the infrastructure is now available to support the expansion of eServices to town employees and citizens.

Figure 4. States with legal barriers to community Internet are shaded in dark gray. States with pending anti-municipal broadband legislation are shaded in blue.
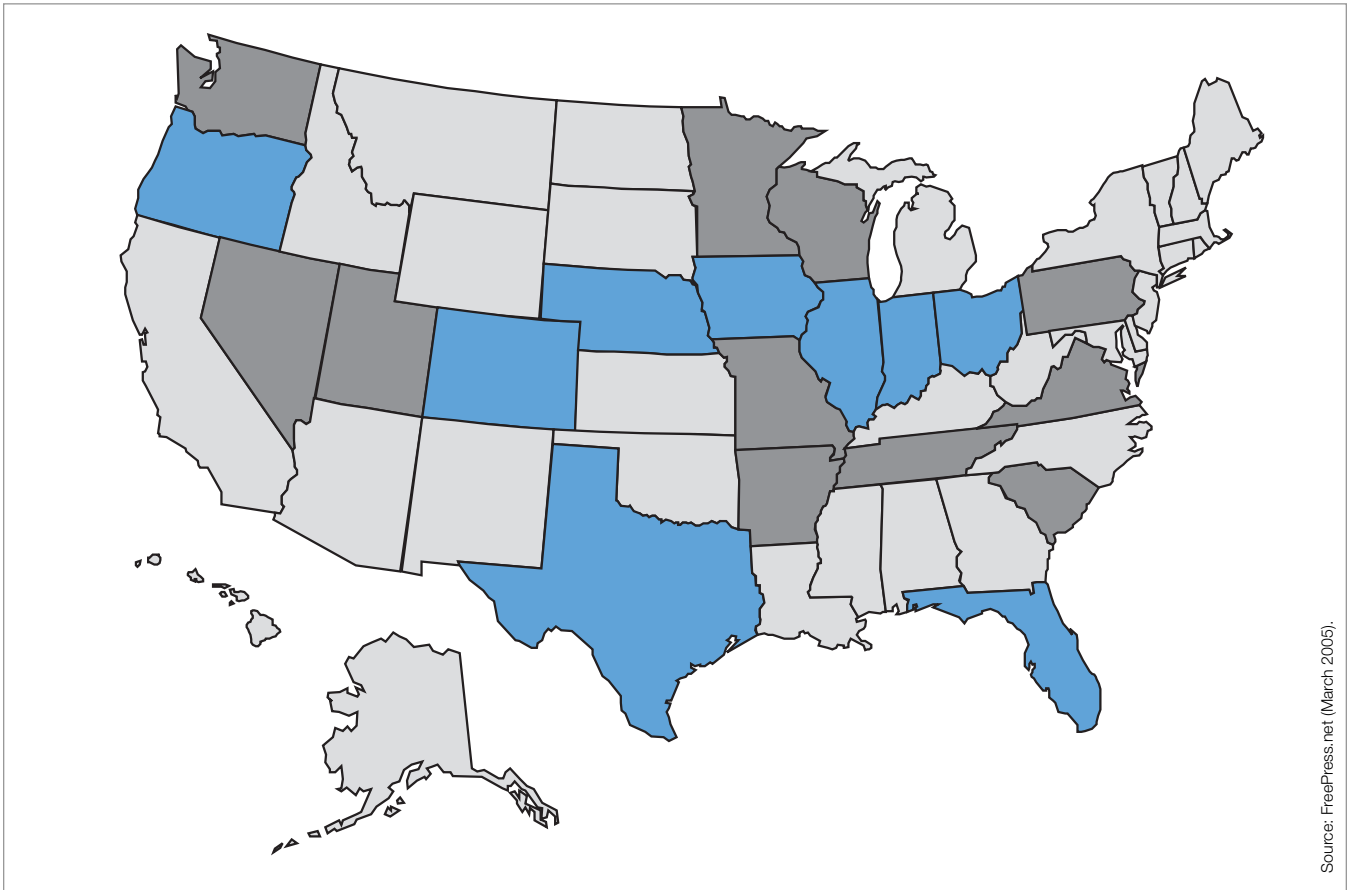
service provision to all? In municipalities with large under-served populations, the business case for subsidizing broad-band-wireless solutions can be made through significant cost savings in city operations thanks to ubiquitous connectivity.

Returns from a cost-reduction program, where a municipality reduces its operating budget by $100,000 or $1 million, could become the "profits" used to pay the private-industry service provider.

Through public- and private-sector partnerships, service to low-income neighborhoods might then be directly linked to improvement in city operations, with the public entity guaranteeing a certain amount of traffic and assuming some of the risk. In this way the city jumpstarts the process with critical leadership and an overarching vision.

Intel® Digital Communities Initiative

The Intel® Digital Communities Initiative brings together tech-nology leaders and progressive cities worldwide to plan and deploy advanced digital services for communities. These services transform the way Digital Communities live, work, and play via a solutions framework that includes wireless broadband connectivity, core computing technologies, and interoperable applications. Benefits include improved government efficiency in delivering services, increased economic opportunity for businesses, enhanced safety and security for citizens, and easier access to information for everyone. Solution examples include police officers submitting reports from the field, parents collaborating elec-tronically with teachers, and citizens renewing their driver's license without having to visit an office. For more information, please visit **www.intel.com/go/digitalcommunities.**

Additional Resources

Center for Digital Government, A Strategic Guide for Local Government: On Wireless and the Community Infrastructure.
www.centerdigitalgov.com/

Civitium, Wireless Broadband: The Foundation for Digital Cities: A Cookbook for Communities.
www.civitium.com

Intel Corp., 1. Creating the Digital Community.
2. Understanding Wi-Fi and WiMAX as Metro-Access Solutions.
www.intel.com/go/digitalcommunities

Muniwireless, First Anniversary Report.
www.muniwireless.com

Pronto Networks, Corpus Christi, TX, Pioneers Metro-Wide Wi-Fi Mesh Net: A Case Study
www.prontonetworks.com

Wireless Internet Institute, 1. The Wireless Internet and Municipal Government. 2. The Wireless Internet and Municipal Public Safety.
www.w2i.org

[1] In the first quarter of 2005, some 110 city and regional broadband networks (US and non-US) had been deployed for public access and municipal/ports/ public safety, with a dozen more in planning stages. See March 2005 Report, by Esme Vos, MuniWireless.com.

[2] See Wireless Broadband: The Foundation for Digital Cities: A Cookbook for Communities, by Matt Stone, Government Strategist, Civitium, LLC (September 2004); civitium.com.

[3] Adapted from Pronto Networks' "Solutions for Municipalities/Metro-Scale Hot Zones": www.prontonetworks.com/pronto_solutionsMunicipalities.html